

Claims 1-91 (canceled)

92. (previously presented) A bonding structure, suited for bonding a first electric component and a second electric component, comprising:

a pillar over said first electric component; and

a cap over said pillar, wherein said cap has a greatest transverse dimension less than a transverse dimension of said pillar, said cap suited for being bonded to a pad exposed by an opening in an insulation layer of said second electric component, wherein said greatest transverse dimension of said cap is less than a transverse dimension of said opening, wherein said cap is formed over said pillar before said first electric component is bonded to said second electric component.

93. (previously presented) The structure of claim 92, wherein said pillar comprises copper.

94. (withdrawn) The structure of claim 92, wherein said pillar comprises a tin-lead alloy.

95. (withdrawn) The structure of claim 92, wherein said pillar comprises gold.

96. (previously presented) The structure of claim 92, wherein said pillar comprises a tin-silver-copper alloy.

97. (previously presented) The structure of claim 92, wherein said cap comprises solder.

98. (withdrawn) The structure of claim 92, wherein said cap comprises a tin-lead alloy.

99. (previously presented) The structure of claim 92, wherein said cap comprises tin.

100. (previously presented) The structure of claim 92, wherein said cap comprises a lead-free alloy.

101. (previously presented) The structure of claim 92 further comprising a conductive layer between said pillar and said cap, said pillar having a height greater than that of said conductive layer.

102. (previously presented) The structure of claim 101, wherein said conductive layer has a transverse dimension less than said transverse dimension of said pillar.

103. (previously presented) The structure of claim 101, wherein said conductive layer has a transverse dimension greater than said greatest transverse dimension of said cap.

104. (previously presented) The structure of claim 92, wherein said cap has a melting point lower than that of said pillar.

105. (previously presented) The structure of claim 92 further comprising a metal layer between said pillar and a pad of said first electric component, said pillar having a height greater than that of said metal layer.

1064. (currently amended) The structure of claim 1053, wherein said metal layer comprises titanium.

1075. (currently amended) The structure of claim 1053, wherein said metal layer comprises tungsten.

1086. (currently amended) The structure of claim 1053, wherein said metal layer comprises chromium.

1097. (currently amended) The structure of claim 1053, wherein said metal layer comprises copper.

1108. (currently amended) The structure of claim 1053, wherein said metal layer comprises nickel.

11199. (currently amended) The structure of claim 1053, wherein said metal layer comprises cobalt.

1129. (currently amended) The structure of claim 1053, wherein said metal layer comprises silver.

1131. (currently amended) The structure of claim 1053, wherein said metal layer comprises gold.

1142. (currently amended) The structure of claim 1053, wherein said metal layer comprises tin.

1153. (currently amended) The structure of claim 1053, wherein said metal layer comprises vanadium.

1164. (currently amended) The structure of claim 1053, wherein said metal layer comprises palladium.

1175. (currently amended) The structure of claim 92, wherein said first electric component comprises a chip.

1186. (currently amended) The structure of claim 92, wherein said first electric component comprises a wafer.

1197. (currently amended) The structure of claim 92, wherein said second electric component comprises a substrate, and said insulation layer comprises a solder mask layer.

12048. (currently amended) A bonding structure, comprising:  
a pillar comprising copper and formed using a process comprising electroplating; and  
a cap comprising tin and over said pillar, wherein said cap has a greatest transverse dimension less than a transverse dimension of said pillar and has a height less than a height of said pillar.

1219. (currently amended) The structure of claim 12048, wherein said pillar is over a chip or wafer.

1220. (currently amended) The structure of claim 1219 further comprising a metal layer between said pillar and said chip or wafer, said pillar having a thickness greater than that of said metal layer.

1231. (currently amended) The structure of claim 1220, wherein said metal layer comprises titanium, tungsten, chromium, copper, nickel, cobalt, silver, gold, tin, vanadium or palladium.

1242. (currently amended but withdrawn) The structure of claim 12048, wherein said cap comprises a tin-lead alloy.

1253. (currently amended) The structure of claim 12048, wherein said cap comprises a lead-free alloy.

1264. (currently amended) The structure of claim 12048 further comprising a conductive layer between said pillar and said cap, said pillar having a height greater than that of said conductive layer.

1275. (currently amended) The structure of claim 1264, wherein said conductive layer has a transverse dimension less than said transverse dimension of said pillar.

1286. (currently amended) The structure of claim 1264, wherein said conductive layer has a transverse dimension greater than said greatest transverse dimension of said cap.

1297. (currently amended) The structure of claim 12048, wherein said cap has a melting point lower than that of said pillar.

13028. (currently amended but withdrawn) A bonding structure, comprising:  
a pillar comprising gold; and  
a cap comprising tin and over said pillar, wherein said cap has a greatest transverse dimension less than a transverse dimension of said pillar.

13129. (currently amended but withdrawn) The structure of claim 13028, wherein said pillar is over a chip or wafer.

1320. (currently amended but withdrawn) The structure of claim 13129 further comprising a metal layer between said pillar and said chip or wafer, said pillar having a thickness greater than that of said metal layer.

1334. (currently amended but withdrawn) The structure of claim 1320, wherein said metal layer comprises titanium, tungsten, chromium, copper, nickel, cobalt, silver, gold, tin, vanadium or palladium.

1342. (currently amended but withdrawn) The structure of claim 13028, wherein said cap comprises a tin-lead alloy.

1353. (currently amended but withdrawn) The structure of claim 13028, wherein said cap comprises a lead-free alloy.

1364. (currently amended but withdrawn) The structure of claim 13028 further comprising a conductive layer between said pillar and said cap, said pillar having a height greater than that of said conductive layer.

1375. (currently amended but withdrawn) The structure of claim 1364, wherein said conductive layer has a transverse dimension less than said transverse dimension of said pillar.

1386. (currently amended but withdrawn) The structure of claim 136, wherein said conductive layer has a transverse dimension greater than said greatest transverse dimension of said cap.

1397. (currently amended but withdrawn) The structure of claim 13028, wherein said cap has a melting point lower than that of said pillar.

14038. (currently amended but withdrawn) A bonding structure, comprising:  
a pillar comprising a tin-lead alloy; and  
a cap over said pillar, wherein said cap has a greatest transverse dimension less than a transverse dimension of said pillar.

14139. (currently amended but withdrawn) The structure of claim 14038, wherein said pillar is over a chip or wafer.

1420. (currently amended but withdrawn) The structure of claim 14139 further comprising a metal layer between said pillar and said chip or wafer, said pillar having a thickness greater than that of said metal layer.



143+. (currently amended but withdrawn) The structure of claim 1420, wherein said metal layer comprises titanium, tungsten, chromium, copper, nickel, cobalt, silver, gold, tin, vanadium or palladium.

1442. (currently amended but withdrawn) The structure of claim 14038, wherein said cap comprises a tin-lead alloy.

1453. (currently amended but withdrawn) The structure of claim 14038, wherein said cap comprises a tin.

1464. (currently amended but withdrawn) The structure of claim 14038, wherein said cap comprises a lead-free alloy.

1475. (currently amended but withdrawn) The structure of claim 14038 further comprising a conductive layer between said pillar and said cap, said pillar having a height greater than that of said conductive layer.

1486. (currently amended but withdrawn) The structure of claim 1475, wherein said conductive layer has a transverse dimension less than said transverse dimension of said pillar.

1497. (currently amended but withdrawn) The structure of claim 1475, wherein said conductive layer has a transverse dimension greater than said greatest transverse dimension of said cap.

15048. (currently amended but withdrawn) The structure of claim 14038, wherein said cap has a melting point lower than that of said pillar.

15149. (currently amended) A bonding structure, comprising:  
a pillar comprising a tin-silver-copper alloy; and  
a cap over said pillar.

1520. (currently amended) The structure of claim 15149, wherein said pillar is over a chip or wafer.

1534. (currently amended) The structure of claim 1520 further comprising a metal layer between said pillar and said chip or wafer, said pillar having a thickness greater than that of said metal layer.

1542. (currently amended) The structure of claim 1534, wherein said metal layer comprises titanium, tungsten, chromium, copper, nickel, cobalt, silver, gold, tin, vanadium or palladium.

1553. (currently amended but withdrawn) The structure of claim 15149, wherein said cap comprises a tin-lead alloy.

1564. (currently amended) The structure of claim 15149, wherein said cap comprises a tin.

1575. (currently amended) The structure of claim 15149, wherein said cap comprises a lead-free alloy.

1586. (currently amended) The structure of claim 15149, wherein said cap comprises a tin-bismuth alloy.

1597. (currently amended) The structure of claim 15149 further comprising a conductive layer between said pillar and said cap, said pillar having a height greater than that of said conductive layer.

16058. (currently amended) The structure of claim 1597, wherein said conductive layer has a transverse dimension less than said transverse dimension of said pillar.

16159. (currently amended) The structure of claim 1597, wherein said conductive layer has a transverse dimension greater than said greatest transverse dimension of said cap.

**1629. (currently amended) The structure of claim 15149, wherein said cap has a melting point lower than that of said pillar.**